IN THE CLAIMS:

Please amend claim 29 and cancel claims 24-27 and 63-66 without prejudice.

1. (Original) A micro-cavity resonator, comprising:

a micro-cavity; and

a substrate,

portions of the substrate located below the micro-cavity being removed to form a pillar, the pillar supporting the ultra-high Q micro-cavity, whereby optical energy travels along an inner surface of the micro-cavity.

2. (Original) The resonator of claim 1, the micro-cavity comprising an ultra-high Q planar micro-cavity.

3. (Original) The resonator of claim 1, the micro-cavity comprising an ultra-high Q silica micro-cavity.

4. (Original) The resonator of claim 1, the micro-cavity being substantially circular and having a diameter of about 10 micrometers to about 500 micrometers.

5. (Original) The resonator of claim 1, the micro-cavity having a toroid shape.

6. (Original) The resonator of claim 5, the toroid-shaped micro-cavity having a thickness of about five to about ten micrometers.

7. (Original) The resonator of claim 1, the micro-cavity having an elliptical shape.

8. (Original) The resonator of claim 1, the micro-cavity being substantially parallel to a top surface of the pillar.

9. (Original) The resonator of claim 1, the micro-cavity having a Q value of at least 1.00 x 10^8.

10. (Original) The resonator of claim 9, the micro-cavity having a Q value of about 10^8 to about 5 x 10^8.

11. (Original) The resonator of claim 1, the micro-cavity having a diameter of at least about 10 micrometers and a Q value of about 500 million.

12. (Original) The resonator of claim 1, the micro-cavity comprising a glass material having a melting point that is lower than a melting point of the substrate.

13. (Original) The resonator of claim 1, a resonant mode within the micro-cavity comprising a whispering-gallery mode (WGM).

14. (Original) The resonator of claim 1, the substrate comprising a silicon substrate.

15. (Original) The resonator of claim 1, further comprising an etchant, the substrate underneath the micro-cavity being removed by the etchant.

16. (Original) The resonator of claim 15, the etchant comprising a xenon difluoride (XeF2) gas.

17. (Original) The resonator of claim 16, wherein the XeF2 gas isotropically etches the substrate beneath a periphery of the micro-cavity to form the pillar.

18. (Original) The resonator of claim 17, the substrate comprising a silicon substrate.

19. (Original) The resonator of claim 1, the pillar having a tapered shape.

20. (Original) The resonator of claim 1, further comprising a rare Earth dopant, the micro-cavity including the rare earth dopant.

21. (Original) The resonator of claim 20, the rare Earth dopant being erbium, ytterbium, or neodymium.

22. (Original) The resonator of claim 1, further comprising an optically active component within the micro-cavity.

23. (Original) The resonator of claim 1, the micro-cavity having a biotinlynated surface.

24. (Canceled).

25. (Canceled).

26. (Canceled).

27. (Canceled).

28. (Original) The resonator of claim 1, the micro-cavity comprising a silica ultra-high Q micro-cavity, and the substrate comprising a silicon substrate.

29. (Currently Amended) An ultra-high Q micro-cavity resonator, comprising:

an optical material; and

a substrate that supports the optical material, wherein a heat source melts the optical material so that a periphery of the optical material adheres to ~~address upon~~ itself to form an ultra-high Q micro-cavity, and wherein optical energy travels along an inner surface of the ultra-high Q micro-cavity.

30. (Original) The resonator of claim 29, the optical material comprising silica.

31. (Original) The resonator of claim 29, the optical material comprising a glass material having a melting point that is lower than a melting point of the substrate.

32. (Original) The resonator of claim 29, the optical material comprising a disk, wherein a diameter of the disk becomes smaller when heated.

33. (Original) The resonator of claim 32, wherein the diameter decreases until the molten optical material collapses after which the diameter remains substantially constant.

34. (Original) The resonator of claim 29, the ultra-high Q micro-cavity comprising an ultra-high Q planar micro-cavity.

35. (Original) The resonator of claim 29, the ultra-high Q micro-cavity comprising an ultra-high Q silica micro-cavity.

36. (Original) The resonator of claim 29, the ultra-high Q micro-cavity being substantially circular and having a diameter of about 10 micrometers to about 500 micrometers

37. (Original) The resonator of claim 29, the ultra-high Q micro-cavity having a toroid shape.

38. (Original) The resonator of claim 37, the toroid having a thickness of about five to about ten micrometers.

39. (Original) The resonator of claim 29, the ultra-high Q micro-resonator having an elliptical shape.

40. (Original) The resonator of claim 29, the ultra-high Q micro-cavity being substantially parallel to a top surface of the pillar.

41. (Original) The resonator of claim 29, wherein a size of the ultra-high Q micro-cavity is limited by a size of a top surface of the substrate.

42. (Original) The resonator of claim 29, the ultra-high Q micro-cavity having a Q value of at least 1.00 x $10^{8.}$

43. (Original) The resonator of claim 42, the ultra-high Q micro-cavity having a Q value of about 10^8 to about 5 x 10^8.

44. (Original) The resonator of claim 29, the ultra-high Q micro-cavity having a diameter of at least about 10 micrometers and a Q value of about 500 million.

45. (Original) The resonator of claim 29, a resonant mode within the ultra-high Q micro-cavity being a whispering-gallery mode (WGM).

46. (Original) The resonator of claim 29, the substrate comprising a silicon substrate.

47. (Original) The resonator of claim 29, wherein portions of the substrate located below the ultra-high Q micro-cavity are removed to form a pillar, the pillar supporting the ultra-high Q micro-cavity.

48. (Original) The resonator of claim 47 the pillar having a tapered shape.

49. (Original) The resonator of claim 29 further comprising an etchant, the substrate underneath the periphery of the ultra-high Q micro-cavity being removed by the etchant.

50. (Original) The resonator of claim 49, the etchant comprising xenon difluoride (XeF_2) gas.

51. (Original) The resonator of claim 50, wherein the XeF_2 gas isotropically etches the substrate beneath the periphery of the micro-cavity.

52. (Original) The resonator of claim 29, the heat source comprising an Excimer laser.

53. (Original) The resonator of claim 53, wherein the Excimer laser heats and liquefies the optical material.

54. (Original) The resonator of claim 29, the heat source comprising a CO_2 laser.

55. (Original) The resonator of claim 54, wherein the CO_2 laser emits radiation having a wavelength of about 10.6 micrometers.

56. (Original) The resonator of claim 54, wherein the CO_2 laser heats the optical material for about 1 microsecond to about 10 seconds.

57. (Original) The resonator of claim 54, wherein the CO_2 laser heats and liquefies the optical material.

58. (Original) The resonator of claim 29, wherein the optical material comprises silica and the substrate comprises silicon.

59. (Original) The resonator of claim 29, the optical material having a biotinlynated surface.

60. (Original) The resonator of claim 29, further comprising a dopant, the ultra-high Q micro-cavity including the dopant.

61. (Original) The resonator of claim 60, the dopant being erbium, ytterbium, or neodymium.

62. (Original) The resonator of claim 29, further comprising an optically active component within the ultra-high Q micro-cavity.

63. (Canceled).

64. (Canceled).

65. (Canceled).

66. (Canceled).

67. (Original) A planar micro-cavity resonator, comprising:
a toroid-shaped planar silica micro-cavity; and
a silicon substrate;
wherein portions of the silicon substrate located below a periphery of the toroid-shaped planar silica micro-cavity are isotropically etched to form a silicon pillar, the silicon pillar supporting the toroid-shaped planar silica micro-cavity, and wherein light energy traverses along an inner surface of the toroid-shaped planar micro-cavity.

68. (Original) A method of forming a micro-cavity, comprising:
providing a substrate and an optical material;
coating the substrate with silicon dioxide;
etching the substrate to form a pillar, the pillar supporting the optical material; and
heating a periphery of the optical material so that the periphery melts and adheres to itself to form the micro-cavity, whereby optical energy travels along an inner surface of the micro-cavity.

69. (Original) The method of claim 68, providing the substrate further comprising providing a silicon substrate.

70. (Original) The method of claim 69, wherein etching the silicon substrate to form a silicon pillar further comprises isotropically etching the silicon substrate with a xenon difluoride gas.

71. (Original) The method of claim 69, providing the optical material further comprising silica (SiO_2).

72. (Original) The method of claim 69, wherein heating the periphery of the optical material further comprises heating the periphery with an Excimer laser.

73. (Original) The method of claim 72, wherein heating the periphery with the Excimer laser further comprises liquefying the optical material.

74. (Original) The method of claim 69, wherein heating the periphery of the optical material further comprises heating the periphery with a CO_2 laser.

75. (Original) The method of claim 74, wherein heating the periphery with the CO_2 laser further comprises heating the periphery with the C02 laser at a wavelength of about 10.6 micrometers.

76. (Original) The method of claim 74, wherein heating the periphery with the CO_2 laser further comprises heating the periphery for about 1 microsecond to about 10 seconds.

77. (Original) The method of claim 74, wherein heating the periphery with the CO_2 laser further comprises liquefying the optical material.